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Cold neutron detection with far ultraviolet radiation from noble-gas excimers MICHAEL A. COPLAN, TIMOTHY KOETH, ALEXANDER L. KOWLER, MOHAMAD I. AL-SHEIKHLY, University of Maryland, CHRISTOPHER M. LAVELLE, ERIC MILLER, Johns Hopkins University Applied Physics Laboratory, ALAN K. THOMPSON, ROBERT E. VEST, National Institute of Standards and Technology, CHARLES W. CLARK, Joint Quantum Institute, NEUTRON OBSERVATORY COLLABORATION — The energetic MeV particles resulting from the capture of cold neutrons by ^{10}B are used for the efficient formation of excimers in a surrounding noble gas at atmospheric pressure. Decay of the excimers results in the emission of far ultraviolet (FUV) radiation. Our measurements indicate that tens of thousands of FUV photons are produced for each neutron absorbed.[1] The detection of the photons forms the basis of an efficient, stable, and robust neutron detector. To increase efficiency, ^{10}B films have been deposited on arrays of silicon substrates and B_4C coatings have been applied to reticulated vitreous carbon foams.[2] We have also begun experiments with wavelength-shifting compounds that convert the FUV radiation into visible light, which is then detected by a microphotomultiplier. A detector research platform has been established on a dedicated cold-neutron beamline at the NIST Center for Neutron Research. Details of our recent work can be found at the Neutron Observatory website, http://j.mp/N3utr0n .

[1]J. C. McComb, *et al., J. Appl. Phys.* **115**, 144504 (2014)
[2]C. M. Lavelle, *et al., Appl. Phys. Lett.* **106**, 094103 (2015)

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